

The silicon crystal exposed to the beam is only 300 μm thick and 19 mm in height. It is a machined part of a large (46 mm in diameter, 50 mm in height) block of silicon. The block provides stability, improved heat conduction, and resistance to deformations under bonding stresses. The base of the block is attached to the crystal holder with a thin interface of indium. The crystal holder is easily accessed by lifting the vacuum chamber after unbolting the upper mounting flange. The entire crystal assembly can be replaced by additional releasing of the lower mounting plate and the tapered collar in the saddle (Fig. 4). This flexibility will be useful in testing and evaluation of the crystal cooling designs.

4. Concluding Remarks

Mechanical design of a cryogenically-cooled crystal monochromator for the APS diagnostics beamline has been presented. The unique design of the monochromator will permit simultaneous measurements of the particle beam divergence and size. Tests are planned to evaluate the performance of the different drive mechanisms currently under fabrication, as well as to compare the performance of different cryogenic cooling configurations.

Acknowledgment

This work is supported by the U.S. Department of Energy, Office of Basic Science, under Contract No. W-31-109-ENG-38. Thanks are due to C. Eyberger for editing this paper.

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